

REMARKS

Claims 1, 11 and 16 have been amended; new claims 17 through 19 have been added.

Claims 1-8 and 11-14, and 16-19 are presented for further prosecution on the merits.

Applicants respectfully request reconsideration of the present application in view of the above claim amendments and the following remarks.

I. SUMMARY OF OFFICE ACTION

The Examiner objected to Claim 11 because of a typing informality with respect to the first occurrence of the phrase "said calculating step."

The Examiner rejected Claims 1 and 2 as being anticipated by U.S. Patent No. 5,596,507 to Jones et al.

The Examiner rejected Claims 11, 12 and 14 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,967,567 to Proctor et al.

The Examiner rejected claims 3-8 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,596,507 in view of U.S. Patent No. 6,324,854 to Jayanth.

The Examiner rejected claim 13 under 35 U.S.C. § 103(a) as being unpatentable over Proctor et al. in view of Jones et al.

The Examiner rejected claim 15 under 35 U.S.C. § 103(a) as being unpatentable over Proctor et al. in view of U.S. Patent No. 4,798,055 to Murray et al.

II. SUMMARY OF PRESENT INVENTION

The present invention detects faults in a refrigeration system and provides diagnostic information on the operation of the refrigeration system. The present invention utilizes at least five (and up to nine) parameters of the HVAC system, and determines system performance based on said measured parameters.

III. REPLY TO OFFICE ACTION

A. **Rejections Based on Art**

A rejection under 35 U.S.C. §102(b) requires that each and every element of the claimed invention be taught by the cited reference(s). Since a patent must describe and enable an invention to one skilled in the art, an anticipatory patent by definition must place the claimed invention into the public domain. Clearly, U.S. Patent No. 5,596,507 to Jones et al. (the Jones patent) fails to disclose each and every element of the claimed invention and, therefore, cannot anticipate Applicants' invention.

Jones discloses a predictive maintenance method and apparatus for use with an HVAC system based on fifteen (15) separate and distinct measurements. No where in the Jones patent does it teach that less than 15 measurements may be used to perform the predictive maintenance. (See, *inter alia*, column 3, lines 1-43; column 4, lines 23-30; and Figures 2 and 3.)

In contrast with Jones, Applicants' claimed invention uses only five (5) parameters to detect faults and to provide diagnostics to a refrigeration system. (Alternatively, Applicants also disclose a method that utilizes nine (9) parameters.) The distinction between the number of parameters used to detect system performance (i.e., fifteen versus five) is an important

structural/operational difference, and is also important from a commercial point of view. Most significantly, Jones requires additional hardware to obtain these ten extra parameters, and also requires more memory and other circuitry to perform the requisite calculations. The apparatus disclosed in Jones (e.g., ten extra sensors, ten extra inputs to the microprocessor, circuitry needed to process 15 parameters, etc.) is not similar to the apparatus claimed by Applicants. For this reason alone, Jones cannot anticipate Applicants' invention.

The sheer number of parameters required by Jones makes it more difficult to obtain the required information in order to proceed with the maintenance of the HVAC system. Moreover, with so many parameters and sensors, the probability of an error entering into the computation increases significantly.

If one sensor in the Jones apparatus fails or conveys an inaccurate value, the results of the predictive maintenance method are useless. The reason the results are useless is that Jones does not disclose any method that uses less than 15 parameters. Jones requires either special equipment (the type which a "normal" technician does not carry with him), or special retrofitting of the HVAC system in order to be able to measure all 15 parameters (e.g., in order to measure compressor amperage, condenser motor amperage, etc.).

Applicants use arguably the five most commonly measured parameters of an HVAC system. Every technician trained in basic HVAC maintenance will be able to obtain the 5 parameters using the basic equipment all technicians carry. The utilization of five parameters can be realized in objective terms too; Applicants' apparatus is an improvement over the Jones' disclosure when considering the amount of time needed to diagnose the HVAC system and the likelihood of an error occurring during the measurement stage. The greater the amount of time a

technician needs to spend on a particular HVAC unit, the less locations the technician is available to service (i.e., additional technicians will be needed). Further, if the likelihood of encountering an error is higher, then the technician must spend additional time troubleshooting the Jones' apparatus instead of ascertaining the status of the HVAC unit.

An advantage of Applicants' method is that it standardizes the information collected for each HVAC system. Almost completely independent of the skill or experience level of the technician measuring the 5 parameters, Applicants' invention will be able to accurately determine the status and diagnostics of the HVAC system.

Since Jones does not disclose or even suggest the use of 5 (or 9) parameters, Jones can neither anticipate nor can it make obvious Applicants' independent claim 1 or any claim that depends directly or indirectly therefrom. Accordingly, Applicants respectfully request that all rejections based on 35 USC §102 in view of the Jones patent be withdrawn.

U.S. Patent No. 4,967,567 to Proctor et al. (the Proctor patent) fails to disclose each and every element of the claimed invention and, therefore, cannot anticipate Applicants' invention.

Proctor discloses a system for diagnosing the operation of air conditioning systems. Proctor utilizes a microprocessor and a timer in order to analyze a *set* of data consisting of three separate parameters taken at very specific periods of time. The set of data consists of measurements of discharge pressure, suction pressure, and discharge air temperature taken repeatedly at specific time intervals. Therefore, the apparatus of Proctor requires multiple timers.

In contrast, Applicants' invention does not require a *set of three* measurements taken repeatedly at specific intervals of time. As such, Applicants claimed apparatus does not require

the timers disclosed in Proctor. More importantly, Proctor does not disclose or suggest an alternative to using sets of data and the multiple timers. For these reasons alone, Applicants' claimed method cannot be anticipated or made obvious by Proctor. Accordingly, Applicants respectfully traverse the anticipatory rejection based on Proctor.

Applicants original claim 11 is not disclosed by Proctor; nevertheless, Applicants have amended claim 11 by having the calculation step expressly calculate the superheat of the HVAC system. The Proctor patent does not mention nor does it suggest the calculation of superheat in its disclosure. Therefore, Proctor cannot anticipate or make obvious Applicants' claim 11 or any claim that depends therefrom.

With respect to the Examiner's rejections under 37 CFR §103(a), they all rely on defective combinations (Jones in view of Jayanth, Proctor in view of Jones, and Proctor in view of Murray). For example, the Examiner states that Jones does not teach measuring liquid line refrigerant pressure and suction line refrigerant pressure as taught by Jayanth. (See page 4, paragraph 6 of the Office Action). Jones already discloses the use of fifteen parameters to calculate predictive maintenance; if Jones needed two more parameters to achieve an accurate result, it would have been disclosed. The Examiner provides no explanation as to how Jones (or, for that matter, a person skilled in the art) would incorporate Jayanth into the Jones patent. Moreover, there is no suggestion or motivation in Jones or Jayanth to make such a combination. (See MPEP § 2143.01). Jones is a fully working, fully functional apparatus and method for obtaining the operating conditions of an HVAC system. The addition of Jayanth is superfluous at best and may be destructive at worst (i.e., prevent the Jones apparatus from operating

properly).

Furthermore, Applicants provided arguments why the use of five parameters is distinctive, novel and patentable over the disclosure of the Jones' patent that uses fifteen parameters. The additional two parameters introduced by Jayanth makes the Applicants' claimed invention even less obvious than Jones alone. Moreover, Jayanth does not overcome the significant differences discussed above between Applicants' claims 1 and 2 and the Jones publication.

Unless the Examiner can provide a publication that shows how Jones would use the two additional parameters in addition to its original fifteen parameters, the cited combination of Jones and Jayanth is defective and the §103 rejection must be withdrawn.

Applicant respectfully traverses the rejection of claims 3 - 8 under 35 U.S.C. § 103 as being unpatentable over Jones in view of Jayanth.

Similarly, the combinations of Proctor in view of Jones, and Proctor in view of Murray are defective combinations. It is significant that the Examiner has not offered one word of explanation how a person skilled in the art, having the benefit of the Jones patent (or the Murray patent), could modify the Proctor patent in order to use the set of data taken at specific time periods to diagnose the operation of an HVAC system.

In view of the above, Applicant respectfully traverses the rejection of claim 13 under 35 USC § 103 as being unpatentable over Proctor in view of Jones, and the rejection of claim 15 under 35 USC §103 as being unpatentable over Proctor in view of Murray.

Proctor apparently requires the removal of the refrigerant from the AC system and the

removal of oil from the refrigerant. (See column 7, lines 50-60.) In fact, it would seem that the removal of the refrigerant as taught by Proctor, would affect the readings of the various parameters as taught by Jones and Murray. Accordingly, the teachings of the Jones patent and the Murray patent conflict with the teachings of the Proctor patent. As such, the Examiner has failed to establish a *prima facie* case of obviousness under MPEP §2143.01.

Even if the Jones patent could be combined with the Jayanth patent (or Proctor could be combined with Jones, and/or Proctor could be combined with Murray) — which point Applicants do not concede — without motivation to combine, a rejection based on a *prima facie* case of obviousness is improper. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed Cir. 1998).

B. Non-Art Matters

Applicants have amended claim 11 in order to address the objection raised by the Examiner.

IV. CONCLUSION

Applicants believe they have addressed all issues raised by the Examiner in the outstanding Office Action.

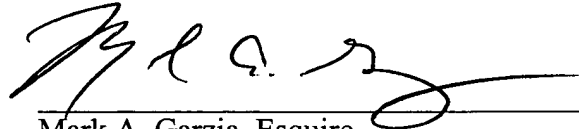
In view of the above amendments and remarks, Applicants respectfully submit that claims 1-8, 11-14 and 16-19 are in condition for allowance and respectfully request the early issuance of a Notice Allowance.

Should the Examiner have any questions regarding this application, he is invited to telephone the undersigned in order to expedite the prosecution of the present application.

Respectfully submitted,

Rossi et al.

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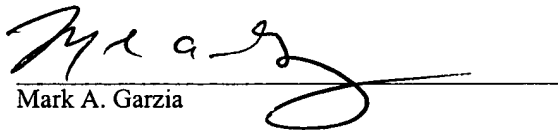
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8 SEPTEMBER 2005
Date


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